
Citation:

Dohme, L and Piggott, D and Backhouse, SH and Morgan, G (2019) Psychological Skills and Characteristics Facilitative of Youth Athletes' Development : A Systematic Review. *Sport Psychologist*, 33 (4). pp. 261-275. ISSN 1543-2793 DOI: <https://doi.org/10.1123/tsp.2018-0014>

Link to Leeds Beckett Repository record:

<https://eprints.leedsbeckett.ac.uk/id/eprint/5781/>

Document Version:

Article (Accepted Version)

Accepted author manuscript version reprinted, by permission, from *Sport Psychologist*, 2019, 33 (4): 261-275, <https://doi.org/10.1123/tsp.2018-0014>. © Human Kinetics, Inc.

The aim of the Leeds Beckett Repository is to provide open access to our research, as required by funder policies and permitted by publishers and copyright law.

The Leeds Beckett repository holds a wide range of publications, each of which has been checked for copyright and the relevant embargo period has been applied by the Research Services team.

We operate on a standard take-down policy. If you are the author or publisher of an output and you would like it removed from the repository, please [contact us](#) and we will investigate on a case-by-case basis.

Each thesis in the repository has been cleared where necessary by the author for third party copyright. If you would like a thesis to be removed from the repository or believe there is an issue with copyright, please contact us on openaccess@leedsbeckett.ac.uk and we will investigate on a case-by-case basis.

Psychological Skills and Characteristics Facilitative of Youth Athletes' Development: A
Systematic Review

Resubmitted to: The Sport Psychologist (Applied Research)

8th of February 2019

ID: TSP.2018-0014.R2

Dohme, L.; Piggott, D.; Backhouse, S.; Morgan, G.

Abstract

Research has identified psychological skills and characteristics (PSCs) perceived to facilitate talented youth athletes' development. However, no systematic categorisation or synthesis of these PSCs exists to date. To provide such synthesis, this systematic review aims to: (i) identify PSCs perceived as facilitative of talented youth athletes' development; (ii) group and label synonymous PSCs; and (iii) categorise PSCs based on definitions established in Dohme, Backhouse, Piggott, and Morgan (2017). PRISMA systematic review guidelines were employed and a comprehensive literature search of SPORTDiscus, PsycINFO, PsycARTICLES, and ERIC completed in November 2017. Twenty-five empirical studies published between 2002 and 2017 met the inclusion criteria. Through thematic analysis, 19 PSCs were identified as facilitative of youth athletes' development. Eight PSCs were categorised as psychological skills (e.g., goal-setting, social support seeking, and self-talk) and eleven as psychological characteristics (e.g., self-confidence, focus, and motivation). The practical implications of these findings are discussed.

Keywords: talent identification, mental skills, sport psychology, definitions

Psychological Skills and Characteristics Facilitative of Youth Athletes' Development: A Systematic Review

Research has long attested to the important role of psychological skills and characteristics (PSCs) in determining elite athletic performance. According to Dohme et al. (2017), psychological characteristics are commonly defined as trait-like dispositions that can be regulated or enhanced through systematic development despite their relative stability (e.g., motivation and focus). Psychological skills on the other hand, are defined as athletes' ability to use learned methods to regulate or enhance their psychological characteristics (e.g., self-talk and imagery). Specifically, Orlick and Partington (1998) and Gould, Dieffenbach, and Moffett (2002) identified that the possession of well-developed PSCs, such as high levels of commitment, motivation, and focus, distinguished successful from less successful athletes. Similarly, Williams and Krane (2001) concluded that having high levels of motivation, commitment, and self-confidence, as well as the ability to set and achieve goals, visualize, and self-regulate, facilitated athletes' ability to achieve peak performance. In an attempt to summarise some of this research, Gould and Maynard (2009) reviewed literature discussing the psychological preparation of Olympic athletes. The authors identified 28 PSCs believed to influence athletes' likelihood to achieve Olympic success, including concentration, competitiveness, sport intelligence, self-talk, imagery, and goal orientation. Despite recent research suggesting that PSCs do not necessarily distinguish elite from super elite athletes (Hardy et al., 2017), it appears to be universally accepted that highly successful athletes possess well-developed PSCs.

More recently, this literature was extended by authors interested in the development of these PSCs in youth athletes (e.g., MacNamara, Button, & Collins, 2010a). Despite similarities between the PSCs facilitative of youth athletes' development and elite athletic

performance to be expected, it is important to distinguish the psychological needs of adult and youth athlete populations. Particularly, experts have suggested that youth athletes should be considered a distinct and special population whose cognitive development needs to be taken into consideration when aiming to develop PSCs within them (e.g., Côté, 1999; Gould & Carson, 2008; McCarthy, Jones, Harwood, & Olivier, 2010). Despite the value and importance of the early, proactive, and systematic development of PSCs having been voiced as early as in 1988 by Vealey, an increase in literature attesting to the fundamental role of PSCs during youth athletes' development has only emerged over the past 15 years (e.g., Côté, Lidor, & Hackfort, 2009). Together, this literature argues that youth athletes' systematic psychological development is important for several reasons. First, young athletes have to dedicate considerable time and effort into the sport they want to excel in, in order to become a successful performer (Larsen, Alfermann, & Christensen, 2012). Particularly during adolescence, this can be challenging, as athletes have to learn to balance their athletic, school, and personal responsibilities effectively (Holt & Dunn, 2004). Second, behaviours and attitudes exerted by aspiring elite athletes need to be facilitative of the continuous engagement in deliberate practice which is associated with effective development, yet rarely inherently motivating (Larsen et al., 2012). Subsequently, PSCs supporting youth athletes' desire to learn and improve through effort and challenge have been suggested to facilitate athletes' successful long-term development (MacNamara, Button, & Collins, 2010b). Third, the pathway to excellence is rarely smooth, instead it is dynamic, complex, challenging, and unpredictable (Henriksen, Stambulova, & Roessler, 2010). Consequently, athletes have to deal effectively with the trials and tribulations the 'pathway to excellence' poses. Some of these trials and tribulations can be anticipated. For instance, athletes are likely to encounter disappointment, injury, transitions, and evolving relationships with coaches, teammates, and

opponents when moving through the stages of athletic development (Keegan, Spray, Harwood, & Lavalley, 2010).

To prepare athletes for these challenges, MacNamara and Collins (2015) suggested that athletes should be equipped with important PSCs early on in their development, to avoid trying to 'quick fix' athletes when problems, such as burnout, fear of failure, or anxiety, occur. Overall, researchers have suggested a range of PSCs that should be developed to decrease the number of athletes unequipped to manage challenges effectively and, in turn, increase athletes' likelihood to achieve their athletic goals. Although researchers seemingly agree that the early systematic development of PSCs is important, there is a degree of divergence regarding the specific PSCs that should be developed. For instance, when conducting a coach education intervention aimed at enhancing youth football coaches' efficacy to develop important PSCs in athletes, Harwood (2008) taught coaches about commitment, communication, concentration, control, and confidence, also known as the '5Cs of football'. In comparison, after interviewing 31 elite performers from team sports, individual sports, and music, MacNamara et al. (2010a; 2010b) identified 10 PSCs as particularly important for enhancing athletes' ability to effectively interact with the developmental opportunities they are afforded. The authors termed these PSCs 'Psychological Characteristics of Developing Excellence' and included commitment, coping with pressure, having a vision of what it takes to succeed, imagery, focus, distraction control, social skills, goal setting, realistic performance evaluation, competitiveness, and game awareness. Across two research teams, we can thus see a level of variance concerning the PSCs recommended to be developed in youth athletes. This variance is not surprising and can occur when researchers study different contexts (e.g., different sports, genders, and ages), use different measures, measure different psychological constructs, or interpret findings

differently (Anshel & Lidor, 2012; Smith, 2010). Whilst the search for a unifying categorisation of PSCs is perhaps premature, it is arguably necessary to synthesise the existing information to make it more accessible to practitioners, coaches, and researchers alike. For instance, sport programs have long been understood as ideal platforms for young individuals to develop physical, psychological, and social skills (Fraser-Thomas, Côté, & Deakin, 2005). Yet, athletes' development of PSCs is not an automated outcome of sport participation, instead it is triggered through appropriate training patterns and social influences (Côté, Baker, & Abernethy, 2007; Côté & Vierimaa, 2014). As a result, coaches are increasingly called upon creating environments that systematically foster the development of PSCs in youth athletes. To increase coaches' ability to provide such environments, a synthesis of PSCs shown to enhance youth athletes' development has been called for (e.g., Larsen et al., 2012). Consequently, the aim of this systematic review is to provide such synthesis by fulfilling three objectives: (i) to identify PSCs perceived as facilitative of talented youth athletes' development; (ii) to group and label synonymous PSCs; and (iii) to categorise PSCs based on definitions established in Dohme et al. (2017).

Method

Development of search strategy

To ensure a rigorous selection of literature, PRISMA systematic review principles based on replicable criteria were employed (Smith, 2010). In accordance with the research aims, a list of key search terms was comprised and trialled in a preliminary search on the SPORTDiscus database (Smith, 2010). Every 10th search result was sampled, assessed for relevance, and investigated to identify additional keywords frequently used in the literature (Weed, Coren, & Fiore, 2009). This process was repeated until the terms that returned the most relevant and specific literature in relation to the research aims were identified. Irrelevant

terms that repeatedly came up in the search results were excluded (e.g., disorder). The final list of search terms included the following:

('psychological characteristic*' OR 'mental skill*' OR 'psychological skill*' OR 'mindset')

AND

(elite OR success* OR excellen* OR perform*)

AND

develop*

AND

(young OR athlet*)

NOT

disorder

The databases SPORTDiscus, PsycINFO, PsycARTICLES, and ERIC were searched for relevant papers. Further, all reference lists of included studies were hand searched to identify papers that may have been missed during the search.

Inclusion and exclusion criteria

To create clearly defined boundaries for the review, inclusion and exclusion criteria were employed (Smith, 2010). The inclusion criteria were: (a) peer reviewed research studies, (b) published in English language, (c) published from January 2002 (when the first relevant study in relation to the research purpose could be identified) until November 2017 (when the formal search was finalised), (d) have gathered original qualitative or quantitative evidence on psychological skills and characteristics perceived as facilitative of young (under 18 years of age) talented athletes' development, (e) involve sporting activities as defined by the Oxford Dictionary of Sport Science and Medicine (Kent, 2006), (f) contain specific reference to either psychological/mental characteristics, psychological/mental skills,

psychological/mental qualities, psychological/mental attributes, psychological/mental techniques, psychological/mental factors, psychosocial characteristics, mindset, or life skills within the title or abstract, and (g) include data that was compatible and relevant to the three aims of this study.

Search returns

The search process came to a close on the 7th of November 2017. In total, 260 papers were considered as holding potential for inclusion. After duplications were removed, abstracts and titles were assessed for relevance. Following the inclusion and exclusion criteria, 45 papers were considered for full-text retrieval and 215 papers excluded. The majority of these studies were excluded as their data was not compatible with or relevant to the three aims of this study, or due to their focus on senior (above 18 years of age) athletes. After hand searching the reference lists of the 45 papers, an additional nine papers were added. Subsequently, the full text of 54 papers was reviewed. Of the 54 papers, 22 met the inclusion criteria of this review. A reference list of these 22 papers was examined by an external advisory team which consisted of five individuals who all had over 12 years of research and applied practice experience in the field of youth athletes' psychological development. The advisory teams' suggestions with regards to further relevant papers were considered. As a result, twelve additional papers were reviewed in full, of which three were included in this review. Hence, 25 studies were analysed for the purpose of this review. Following Moher, Liberati, Tetzlaff, and Altman's (2009) PRISMA flow diagram guidelines, an overview of the search process is outlined in Figure 1.

Data synthesis

Before data was extracted, the lead author established familiarity with the included papers by reading them three times (Glasziou, Irwig, Bain, & Colditz, 2001). In this instance, the word "data" refers to PSCs perceived to facilitate talented youth athletes' development. A

narrative inductive thematic analysis approach was used to identify, organise, and summarise key information (Pope, Mays, & Popay, 2007). The process was inductive as the analysis was not guided by existing theory, instead a bottom up data analysis approach was used (Braun & Clarke, 2013). In addition, a narrative synthesis approach was chosen which “relies primarily on the use of words and text to summarise and explain the findings of multiple studies” (Pope et al., 2007, p. 102), as the majority of findings were derived from qualitative data.

Specifically, text and words were extracted that were perceived to offer insight into the three research aims.

Establishing trustworthiness

To establish trustworthiness, peer debrief - a process of consistent review of data and research process by three supervisors - was employed (Creswell & Miller, 2000). In addition, an advisory team comprised of five external researchers who had previously published studies in the substantive research field supported the initial stages of the review process. Specifically, they assisted with the selection of search terms, inclusion criteria, and screening of initial search results (Smith, 2010).

Findings

General Findings

The 25 papers included in this review comprised a total population size of 4021 athletes (males = 3632, females = 233, and not identified = 35), 75 coaches, 35 parents, nine academy support staff, and two sport psychologists. In total, 34 different individual and team sports were included. Athletes engaged in sports such as soccer (n = 3240), distance running (n = 182), cricket (n = 127), rugby union (n = 54), tennis (n = 34), speed skating and basketball (n = 31), handball (n = 27), gymnastics (n = 27), field hockey (n = 25), and volleyball (n = 23). Together, this overview highlights that a significant amount of

participants were male football players. Of the reviewed studies, 14 focused on identifying PSCs, one life-skills, two Psychological Characteristics of Developing Excellence, and two self-regulatory skills that facilitate athletes' successful development; one on developing PSCs, and five explored PSCs that are perceived to facilitate the development of mental toughness.

Exclusion of constructs

For the purpose of this review psychological constructs, such as mental toughness, Psychological Characteristics of Developing Excellence, self-regulation, and life skills, were considered based on the PSCs that underpin them. For instance, according to MacNamara et al. (2010a; 2010b) the construct Psychological Characteristics of Developing Excellence consists of the PSCs commitment, coping with pressure, having a vision of what it takes to succeed, imagery, focus, distraction control, social skills, goal setting, realistic performance evaluation, competitiveness, and game awareness. Consequently, these PSCs were included in the data analysis of this review. Despite the development of psychological constructs perhaps being an attempt to summarise and consider context specific differences in the development and deployment of important PSCs, Lourenco (2001) argued that the development of constructs can lead to an over complication of research. Subsequently, the decision to refer to constructs' individual PSCs was made to keep the results transparent and inclusive of constructs' underpinning PSCs.

Identification, grouping, labelling, and categorisation of PSCs perceived to facilitate talented youth athletes' development

In total, 92 PSCs were identified as facilitative of youth athletes' development (see Table 1 & 2, column 1 & 2). To understand the meaning of each PSC, the terms used to describe them were analysed using the reviewed literature, as well as sport science, medicine, and psychological dictionaries (Colman, 2008; Kent, 2006; Reber, 1995). This analysis, as

well as in-depth discussions between the lead and co-authors, revealed that various terms were synonyms or closely related to each other allowing terms to be grouped. For example, when analysing the terms 'imagery', 'visualization', and 'mental planning', the first author perceived terms to be synonymous or closely related to each other due to the reviewed papers' descriptions of the terms, the context in which they were referred to, as well as the definitions of these terms outlined in sport science, medicine, and psychological dictionaries. Once grouped, the authors engaged in further discussions to identify an umbrella term that would best represent the shared meaning of the group of terms. In the case of 'imagery', 'visualization', and 'mental planning', the authors agreed that the word 'imagery' would best represented the terms' shared meaning. As a result, 'imagery' is presented under the table heading 'umbrella term' and the terms 'visualization' and 'mental planning' under the table heading 'encompassing terms' (Table 1). This outlines that the terms 'visualisation' and 'mental planning' are encompassed by the umbrella term 'imagery'.

In some instances a further categorisation of encompassing terms, into antecedents (i.e., behaviours or thoughts that preceded the umbrella PSC), synonyms (i.e., a word or phrase that means exactly or nearly the same as the umbrella PSC), and associate behaviours or outcomes (i.e., behaviours or outcomes that are commonly trigger by the associated umbrella PSC) was possible. For instance, the reviewed literature indicated that antecedents of the psychological characteristic 'hard-work ethic' were behaviours or thoughts such as a 'vision of what it takes to succeed' and a 'willingness to sacrifice'. Furthermore, the reviewed literature frequently used terms such as 'commitment' or 'determination' as synonyms of a 'hard-work ethic', wherefore these terms were categorised under the heading 'synonyms'. Finally, the reviewed literature described that a 'hard-work ethic' was often associate with behaviours or outcomes such as 'investment of high levels of effort' or 'quality practice',

wherefore these terms were categorised under the heading of 'associate behaviours/outcomes'. This categorisation process was engaged in for every PSC until agreement between all authors was reached.

Grouping and labelling terms resulted in the identification of 19 umbrella PSCs perceived to enhance youth athletes' development. Each PSC was defined (Table 1 & 2, column 4) based on information elicited from the reviewed literature (Table 1 & 2, column 3). The definitions were aligned to a guiding psychological framework that was established in Dohme et al. (2017). Within this framework, psychological terms frequently used within the talent development literature were divided into two categories, namely psychological skills and psychological characteristics. Psychological skills were defined as "an individual's ability to use learned strategies to accomplish specific results (e.g., the ability to reflect on a piece of work to make it better) ... psychological skills are used to regulate or enhance psychological characteristics either immediately (e.g., getting in the zone before a match) or over time (e.g., building confidence). Being able to use and retrieve complex psychological strategies effectively at the appropriate time makes it a skill that athletes can acquired through systematic long-term practice." (p. 158). In comparison, psychological characteristics were defined as trait-like dispositions that can, despite being fairly stable and enduring across different situations, be enhanced or strengthened through systematic development and training. In addition, the authors explained that "social and contextual influences (e.g., athletes' performance domain or age/stage of development), as well as performance challenges, can impact the development and operationalization of psychological characteristics." (p. 157).

When carefully comparing the definitions of PSCs identified in this review with the definitions established in Dohme et al. (2017), a distinction of the 19 PSCs into psychological

skills and psychological characteristics was possible. Consequently, eight PSCs were categorised as psychological skills, including goal-setting, social support seeking, realistic self-evaluation, imagery, relaxation, maintaining a sense of balance, (pre-) performance routines, and self-talk (Table 1, column 1). The remaining 11 PSCs were categorised as psychological characteristics, including self-confidence, hard-work ethic, emotional control, interpersonal competencies, focus, motivation, competitiveness, positivity, resilience, sport intelligence, and independence (Table 2, column, 1). A detailed description of each PSC can be found in Tables 1 and 2, column 4. Within Table 1 and 2 PSCs are organised based on the number of studies that identified the particular PSC as facilitative of youth athletes' development. For example, in Table 1, 20 out of the 25 included studies identified goal-setting as an important psychological skill, consequently it was listed first. Other psychological skills were not as frequently identified as important for youth athletes' development (e.g., social support seeking $n = 14$; imagery $n = 7$) and were subsequently listed behind goal-setting. This order does not indicate that some PSCs have been suggested to be more important, instead, it highlights that certain PSCs appear to be researched more frequently than others are.

Discussion

The objectives of this review were to (i) identify PSCs perceived to facilitate talented youth athletes' development, (ii) group and label synonymous PSCs, and (iii) categorise PSCs based on authors' definitions established in Dohme et al. (2017). In total, 19 PSCs were identified as facilitative of youth athletes' development. Eight PSCs were categorized as psychological skills (e.g., goal-setting, social support seeking, and realistic self-evaluation) and eleven as psychological characteristics (e.g., hard-work ethic, emotional control, and focus). Overall, the reviewed literature suggested that an early, systematic development of

these 19 PSCs can increase youth athletes' likelihood to overcome challenges and, subsequently, achieve athletic excellence (MacNamara & Collins, 2015). For example, young athletes with high levels of motivation, a hard-work ethic, and competitiveness, were deemed more likely to deal effectively with challenges and overcome physical weaknesses, compared to similar talented peers that are lacking these PSCs.

Despite these promising results, the systematic review of the literature also revealed that the development, deployment, and effects of PSCs can be complex, as they are affected by athletes' individual differences (MacNamara et al., 2010b; Mills, Butt, Maynard, & Harwood, 2012). For instance, researchers such as Mills et al. (2012) suggested that not all PSCs recommended in the talent development literature need to be present for athletes to advance to an elite level. Instead, the authors describe that, inevitably, some athletes will successfully transition despite the absence of some PSCs. The authors explained this phenomenon through the compensation effect, which outlines that a lack of capability in one area can be compensated for by very high levels of capability in another area (Bartmus, Neumann, & Marees, 1987). For instance, an athlete with low levels of self-confidence to succeed can compensate by being extremely motivated to succeed. Others, such as MacNamara et al. (2010b), suggested that while the development and deployment of PSCs is evident throughout athletes' development, the manner by which they are deployed depends on athletes' individual characteristics, such as cognitive maturation and age, as well as the context in which athletes are embedded, including athletes' stages of development and performance domains. Specifically, MacNamara et al. (2010b) identified that athletes' development and deployment of PSCs commonly changed throughout the developmental pathway, whereby PSCs appeared to be promoted and reinforced by others, such as parents, teachers, and coaches, throughout the early years of athletes' development and self-initiated

by athletes in their later performance years. Despite this change of behaviour depending strongly on athletes' age, the demands of athletes' performance environment can also effect the development and deployment of PSCs. For instance, athletes who have to specialise early in sports such as gymnastics or ballet appeared to develop the ability to self-regulate the deployment of PSCs earlier than athletes who specialised later in their development (MacNamara et al., 2010b). Finally, it cannot be assumed that equipping talented athletes with PSCs will automatically create elite performers. There is a wide range of other contextual and environmental factors that can significantly affect athletes' chances of reaching the elite level, such as finances, health, and other personal circumstances (Henriksen et al., 2010).

Although PSCs are dependent on athletes' individual differences and affected by contextual variables, youth development systems should not shy away from their development, as it can only benefit athletes (MacNamara & Collins, 2015). Specifically, in addition to positively influencing youth athletes' athletic development, research suggested that PSCs can be successfully transferred to other life domains, such as music, school, and family life; consequently facilitating athletes' development as performers and lifelong learners (e.g., Bean, Kendellen, & Forneris, 2016; Gould & Carson, 2008; Pierce, Kendellen, Camiré, & Gould, 2018). In sum, the systematic development of PSCs appears to have various positive effects on youth athletes and should thus be developed throughout the lifespan, starting as early as possible. Considering the temporality of athletes' cognitive development, it is recommended that the development of PSCs is scaffolded, increasing in complexity over time, and matches the challenges faced by athletes at specific points in their development (MacNamara et al., 2010b).

An additional observation gained through this review, is that approximately half of the reviewed papers referred to a distinct relationship between PSCs (e.g., Connaughton, Wadey, Hanton, & Jones, 2010; Cook, Crust, Littlewood, Nesti, & Allen-Collinson, 2014; Durand-Bush & Salmela, 2002; Howells, 2017). Butt et al. (2010) for example stated "... the psychological skill of positive self-talk is one effective way to build and maintain confidence" (p. 328). Nevertheless, evidence of causality was sparse, as causal relationships between PSCs were not explicitly examined. A potential explanation for this lack of evidence could be that no guiding framework in relation to the distinction and relationship between categories of PSCs existed until recently (Dohme et al., 2017). Furthermore, as illustrated in Tables 1 and 2, several synonyms were used in the reviewed literature to describe one and the same PSC. These PSCs and their hypothetical development were rarely explained, nor good practice examples offered. This lack of insight impedes a clear identification of each PSCs' purpose and development. To facilitate the practical implementation of the current findings, future research is warranted that explores which psychological skills regulate and facilitate particular psychological characteristics.

In relation to the applied implications of these findings, it is envisaged that an effective talent development approach would be to systematically develop the 19 PSCs identified within this review early on during aspiring elite athletes' development (MacNamara & Collins, 2015). Helping young developing athletes to fill and refine their "athletic locker" (Figure 2) with appropriate PSCs could equip them with skills that will enable them to deal more effectively with anticipated challenges. As suggested by MacNamara and Collins (2015), it appears that this proactive approach to youth athletes' development would be more appropriate than trying to "quick-fix" problems when they occur. Nevertheless, it is important to note that talented athletes should not be selected or

deselected for performance programs based on their possession of the 19 PSCs (Abbott & Collins, 2002; MacNamara et al., 2010b). Yet, given the current lack of emphasis on the systematic development of PSCs in youth athletes (Larsen et al., 2012) and research highlighting the need to develop athletes not only physically, but also psychologically and socially (Janelle & Hillman, 2003), the current findings contribute to the education of governing bodies and athletes' supportive others, such as coaches and parents. Specifically, it is envisaged that the current findings will enable a more strategic development of youth athletes' PSCs by offering a succinct overview of the PSCs that should be developed during youth athletes' early engagement in sports (MacNamara & Collins, 2015).

Together, the reviewed literature has significantly enhanced our understanding of the importance of developing PSCs in talented youth athletes. Nonetheless, a number of methodological issues which are worth outlining were noticed when reviewing the literature. For instance, some procedural methods were identified that potentially obscured our ability to appropriately interpret the research findings. Firstly, when considering the quantitative measures of PSCs, typically only a selected number of PSCs were researched. Specifically, some studies used measures that assessed a range of specific PSCs (e.g., Test of Performance Strategies: Thomas, Murphy, & Hardy, 1999), whereas others focused on only one particular PSC (e.g., the Multidimensional Perfectionism Scale: Frost, Marten, Lahart, & Rosenblate, 1990). This can lead to an imbalance in the depth and quality with which certain PSCs are researched. Secondly, questionnaires chosen to assess athletes' PSCs are often designed for adult athletes. Consequently, they may not be suitable for the use with young or adolescent athletes, as they do not fulfil the ecological needs of the youth context (MacNamara & Collins, 2015). Finally, it is plausible that other important PSCs may have not yet been identified. After all, researchers typically only identify the PSCs they are looking for. For

example, Gould et al. (2002) argued that a number of PSCs considered important in the general psychological literature, have not yet been explored in the sport context. As a result, Gould and colleagues (2002) investigated the importance of optimism, perfectionism, and hope in relation to youth athletes' development. Overall, this highlights that research in this area has not yet been exhaustive, wherefore the list of PSCs established within this review is perhaps incomplete.

With regards to studies using qualitative research methods, it is possible that researchers' use of language impacted the current findings (Anshel & Lidor, 2012). For instance, when aiming to explore athletes' perceptions and development of mental toughness, Butt, Weinberg, and Clup (2010) provided participants with a specific definition of mental toughness to establish an understanding of the phenomenon before discussing it. Priming participants with this information has the potential to bias their answers and in turn impact research findings. In comparison, some researchers avoided the explicit introduction of academic terms and did not inquire about participants' understanding of them. Unless participants expand upon their thoughts, it is however hard for researchers to interpret what participants mean when using compound terms such as mental toughness or resilience. In a bid to reduce influencing participants' natural jargon and increase our understanding of participants' choice of terms, researchers are encouraged to consider the information they give to and receive from participants more carefully. To do so several strategies can be implemented. For instance, instead of providing participants with definitions of subject specific terms from the onset, researchers could inquire about participants' understanding of the terms first. Similarly, if participants repeatedly refer to a subject specific term, such as mental toughness, it could be helpful to ask participants for an example of mental toughness, such as a situation in which they saw mentally tough behaviour being displayed. Another

issue of qualitative research studies was that they frequently offered insufficient amounts of transparency that gave insight into how researchers had arrived at their conclusions. Specifically, authors tended to identify more PSCs than were reported in the results or discussion sections. For example, Gould et al. (2002) identified 47 subthemes that represented important PSCs of developing athletes. The 47 subthemes were clustered into 40 higher-order themes and categorised into eight umbrella categories. Despite creating a figure that illustrates this categorisation, no written explanation was offered that gave insight into why the authors perceived this categorisation to be final. In addition, a battery of psychological inventories was administered to athletes which created complimentary, but also additional results. Finally, findings from interviews and psychological inventories were summarised into 12 characteristics that were perceived to facilitate athletes' development, yet it is not clear why these particular 12 PSCs were favoured over others. To conclude, it appears that authors frequently cluster findings into higher and lower ordered themes without explaining reasons for this behaviour. Future research should aim to offer more transparency in light of these decisions.

In relation to the design of studies included within this review, several recommendations for improvement can be made. First, samples of athletes that combined a mixture of variables such as gender, types of sport (i.e., individual or team sport), sport (e.g., tennis & football), and ages were frequently used. As outlined by MacNamara et al. (2010b), combining and generalising results from these various different contexts without explicitly referring to their differences can obscure the quality of results. For example, similar to physical demands, psychological demands can vary depending on the sport one engages in. For athletes involved in team sports PSCs such as interpersonal competencies may be more important than for athletes involved in individual sports. Hence, aggregating results across

different contexts serves to undermine our possible understanding of PSCs. Future research should aim to identify which specific PSCs facilitate the development of athletes in different sport contexts, as well as developmental stages. Second, the reviewed studies frequently employed retrospective methods, thus relying strongly on participants' memory. Despite this being a valuable and appropriate method to gather information, it can obscure the in-depth understanding of a phenomenon, as participants may be prone to recall bias. On the flipside, researchers who employed non-retrospective methods rarely engaged in follow up research. To improve research within this area, future studies might combine several research approaches (i.e., retro- and non-retrospective). Third, it appears that some studies gathered information from only one participant population (e.g., athletes or coaches). To strengthen the quality of results, future research should aim to collect data from several populations that influence athletes' development. Fourth, the majority of studies focused on athletes from specific developmental stages, yet generalised their findings. This may obscure our understanding of the development and deployment of PSCs during athletes' development. Studying the acquisition and deployment of PSCs across different ages and stages of athletes' development would be a valuable undertaking in the future.

Strengths and limitations

This systematic review has three main strengths. First, by synthesising, summarising, and explicitly stating the PSCs identified to facilitate youth athletes' development, this review brings much needed clarity, transparency, and simplicity to this research area. Second, this review is based on rigorous inclusion and exclusion criteria, which led to the inclusion of current, relevant, and robust studies. Finally, despite the tentative and provisional nature of this categorisation, this review offers a coherent summary of the extant literature and provides a stimulus for reflection, discussion, and debate amongst the academic community.

Balanced against these strengths, limitations need to be acknowledged. First, the inclusion and exclusion criteria of this review may have led to the exclusion of potentially relevant literature. Specifically, two of the most frequent reasons for excluding papers from this review was authors' focus on adult elite athletes and PSCs that allowed elite athletes to maintain their status, rather than focusing on PSCs that helped to develop athletes. Second, the systematic review process identified studies that are diverse in their research approach (e.g., different designs, methodological quality, types and stages of athletes, etc.). Inevitably, this can impact the validity of the reviews' findings. Specifically, generalising findings from different contexts (e.g., sports or ages) can undermine our understanding of the psychological demands different developmental contexts offer. In addition, it was important to ensure the validity of the diverse methodological approaches used. As a result, the quality assessment of the papers was an ongoing and important process, during which an expert panel constantly checked the quality of papers based on their professional expertise across a range of methodologies. Nevertheless, to make this process more replicable and robust, future systematic reviews should consider the use of quality assessment tools, such as the Mixed Method Appraisal Tool by Pluye et al. (2011). Third, while the review offers a succinct overview of PSCs that should be fostered within talented youth athletes, it was not possible to provide detailed insight into the make-up and development of each PSC. Consequently, future publications should offer an in-depth overview of each PSC and how it can be developed to expand upon the somewhat simplistic overview of PSCs within this review. Finally, some of the PSCs identified as important for youth athletes' development may match or vary from the PSCs facilitative of elite athletic performance. Despite alluding to this phenomenon, this review was unable to offer a detailed comparison of the PSCs that are

important across athletes' lifespan. As this is an important and worthwhile endeavour, future research is encouraged to explore this topic in more depth.

Conclusion

The talent development literature is a diverse and evolving body of research. To increase the practical utility of research findings, this review aimed to address calls for more synergy and simplicity. Specifically, the review identified, critically analysed, summarised, synthesised, and described PSCs perceived to increase talented youth athletes' likelihood of fulfilling their athletic potential. It is envisioned that this synthesis will help athletes' supportive others to proactively and systematically foster athletes' positive psychological development. In addition, the findings may encourage and assist researchers in provoking valuable discussions (or even collaborations) across disciplinary and paradigmatic borders.

References

- Abbott, A., & Collins, D. (2002). A theoretical and empirical analysis of a 'stage of the art' talent identification model. *High Ability Studies*, 13, 157-178.
doi:10.1080/1359813022000048798
- Anshel, M. H., & Lidor, R. (2012). Talent detection programs in sport: The questionable use of psychological measures. *Journal of Sports Behavior*, 35, 239-266.
- Bartmus, U., Neumann, E., & de Marees, H. (1987). The talent problem in sport.
International Journal of Sport Medicine, 8, 415-416.
- Bean, C., Kendellen, K., & Forneris, T. (2016). Moving beyond the gym: Exploring life skill transfer within a female physical activity-based life skills program. *Journal of Applied Sport Psychology*, 28, 274-290. doi:10.1080/10413200.2015.1124155
- Butt, J., Weinberg, R., & Clup, B. (2010). Exploring mental toughness in NCAA athletes.
Journal of Intercollegiate Sport, 3, 316-332. doi:10.1123/jis.3.2.316
- Colman, A. M. (2008). *A Dictionary of Sport Psychology* (3rd ed.). Oxford, UK: Oxford University Press.
- Connaughton, D., Hanton, S., & Jones, G. (2010). The Development and maintenance of mental toughness in the world's best performers. *The Sport Psychologist*, 24, 168-193.
doi:10.1123/tsp.24.2.168
- Connaughton, D., Wadey, R., Hanton, S., & Jones, G. (2008). The development and maintenance of mental toughness: Perceptions of elite performers. *Journal of Sports Sciences*, 26, 83-95. doi:10.1080/02640410701310958
- Cook, C., Crust, L., Littlewood, M., Nesti, M., & Allen-Collinson, J. (2014). 'What it takes': Perceptions of mental toughness and its development in an English Premier League

Soccer Academy. *Qualitative Research in Sport, Exercise and Health*, 6, 329-247.

doi:10.1080/2159676X.2013.857708

Côté, J., Baker, J., & Abernethy, B. (2007). Practice and play in the development of sport expertise. In G. Tenenbaum & R. C. Eklund (Eds.), *Handbook of sport psychology* (3rd ed., pp. 184-202). New York, US: Wiley.

Côté, J., Lidor, R., & Hackfort, D. (2009). ISSP Position Stand: To sample or to specialize? Seven postulates about youth sport activities that lead to continued participation and elite performance. *International Journal of Sport and Exercise Psychology*, 7, 7-17.

doi:10.1080/1612197X.2009.9671889

Côté, J., & Vierimaa, M. (2014). The developmental model of sport participation: 15 years after its first conceptualization. *Science and Sports*, 29, 63-69.

doi:10.1016/j.scispo.2014.08.133

Creswell, J., & Miller, D. (2000). Determining validity in qualitative inquiry. *Theory into Practice*, 39, 124-130. doi:10.1207/s15430421tip3903_2

Dohme, L.-C., Backhouse, S., Piggott, D., & Morgan, G. (2017). Categorizing and defining popular psychological terms used within the youth athlete talent development literature: a systematic review. *International Review of Sport and Exercise Psychology*, 10, 134-163. doi: 10.1080/1750984X.2016.1185451

Durand-Bush, N., & Salmela, J. (2002). The development and maintenance of expert athletic performance: Perceptions of world and Olympic champions. *Journal of Applied Sport Psychology*, 14, 154-171. doi:10.1080/10413200290103473

Forsman, H., Blomqvist, M., Davids, K., Konttinen, N., & Liukkonen, J. (2016). The role of sport-specific play and practice during childhood in the development of adolescent

- Finnish team sport athletes. *International Journal of Sports Science and Coaching*, 11, 69-77. doi: 10.1177/1747954115624816
- Fraser-Thomas, J., Côté, J., & Deakin, J. (2005). Youth sport programs: An avenue to foster positive youth development. *Physical Education and Sport Pedagogy*, 10, 19-40. doi:10.1080/1740898042000334890
- Frost, R., Marten, P., Lahart, C., & Rosenblate, R. (1990). The dimensions of perfectionism. *Cognitive Therapy and Research*, 14, 449-468. doi:10.1007/BF01172967
- Glasziou, P. P., Irwig, L., Bain, C., & Colditz, G. (2001). *Systematic reviews in health care: A practical guide*. Cambridge, UK: Cambridge University Press.
- Gould, D., & Carson, S. (2008). Life skills development through sport: Current status and future directions. *International Review of Sport and Exercise Psychology*, 1, 58-78. doi:10.1080/17509840701834573
- Gould, D., Dieffenbach, K., & Moffet, A. (2002). Psychological characteristics and their development in Olympic champions. *Journal of Applied Sport Psychology*, 14, 172-204. doi:10.1080/10413200290103482
- Gould, D., & Maynard, I. (2009). Psychological preparation for the Olympic Games. *Journal of Sport Sciences*, 27, 1393-1408. doi:10.1080/02640410903081845
- Hardy, L., Barlow, M., Evans, L., Rees, T., Woodman, T., & Warr, C. (2017). Great British medalists: Psychosocial biographies of super-elite and elite athletes from Olympic sports. *Progress in Brain Research*, 232, 1-119. doi:10.1016/bs.pbr.2017.03.004
- Harwood, C. (2008). Developmental consulting in a professional football academy: The 5Cs coaching efficacy program. *The Sport Psychologist*, 22, 109-133. doi:10.1123/tsp.22.1.109

- Henriksen, K., Stambulova, N., & Roessler, K. K. (2010). Holistic approach to talent development environments: A successful sailing milieu. *Psychology of Sport and Exercise, 11*, 212-222. doi:10.1016/j.psychsport.2009.10.005
- Hill, A., MacNamara, A., & Collins, D. (2015). Psychobehaviorally based features of effective talent development in Rugby Union: A coach's perspective. *The Sport Psychologist, 29*, 201-212. doi:10.1123/tsp.2014-0103
- Holland, M. J. G., Woodcock, C., Cumming, J., & Duda, J. L. (2010). Mental qualities and employed mental techniques of young elite team sport athletes. *Journal of Clinical Sport Psychology, 4*, 19-38. doi:10.1123/jcsp.4.1.19
- Holt, N. L., & Dunn, J. G. H. (2004). Toward a grounded theory of the psychological competencies and environmental conditions associated with soccer success. *Journal of Applied Sport Psychology, 16*, 199-219. doi:10.1080/10413200490437949
- Höner, O., & Feichtinger, P. (2016). Psychological talent predictors in early adolescence and their empirical relationship with current and future performance in soccer. *Psychology of Sport and Exercise, 25*, 17-26. doi:10.1016/j.psychsport.2016.03.004
- Howells, K. (2017). Butterflies, magic carpets, and scary wild animals: An intervention with a young gymnast. *Sport and Exercise Psychology, 1*, 26-37. doi:10.1123/cssep.2016-0006
- Janelle, C., & Hillman, C. (2003). Expert performance in sport: Current perspectives and critical issues. In J. L. Starkes & K. A. Ericsson (Eds.), *Expert performance in sport* (pp. 19-48). Champaign, IL: Human Kinetics.
- Jones, M. I., & Lavalley, D. (2009). Exploring the life skills needs of British adolescent athletes. *Psychology of Sport and Exercise, 10*, 159-167. doi:10.1016/j.psychsport.2008.06.005

- Jonker, L., Elferink-Gemser, M. T., & Visscher, C. (2010). Differences in self-regulatory skills among talented athletes: The significance of competitive level and type of sport. *Journal of Sport Science*, 28, 901-908. doi:10.1080/02640411003797157
- Jooste, J., Van Wyk, J. G., & Steyn, B. J. (2013). The relationship between mental skills and level of cricket participation. *African Journal for Physical Health Education, Recreation and Dance*, 19, 180-192.
- Keegan, R., Spray, C., Harwood, C., & Lavalley, D. (2010). Motivational atmosphere in youth sport: Coach, parents, and peer influences on motivation in specializing sport participants. *Journal of Applied Sport Psychology*, 22, 87-105.
doi:10.1080/10413200903421267
- Kent, M. (2006). *The Oxford dictionary of sports science and medicine* (3rd ed.). Oxford, UK: Oxford University Press.
- Kruger, A., Pienaar, A., Du Plessis, E., & Van Rensburg, L. J. (2012). The importance of psychological characteristics in potentially talented adolescent long distance runners: Sport psychology. *African Journal for Physical Health Education, Recreation and Dance*, 18, 413-422.
- Larsen, C., Alfermann, D., & Christensen, M. K. (2012). Psychological skills in a youth soccer academy: A holistic ecological perspective. *Sport Science Review*, 11, 51-74.
doi:10.2478/v10237-012-0010-x
- Lourenco, O. (2001). The danger in words: A Wittgensteinian lesson for developmentalists. *New ideas in Psychology*, 19, 89-115. doi:10.1016/S0732-118X(01)00002-2
- MacNamara, A., & Collins, D. (2015). Profiling, exploiting, and countering psychological characteristics in talent identification and development. *The Sport Psychologist*, 29, 73-81. doi:10.1123/tsp.2014-0021

- MacNamara, A., Button, A., & Collins, D. (2010a). The role of psychological characteristics in facilitating the pathway to elite performance. Part 1: Identifying mental skills and behaviours. *The Sport Psychologist*, 24, 52-73. doi:10.1123/tsp.24.1.52
- MacNamara, A., Button, A., & Collins, D. (2010b). The role of psychological characteristics in facilitating the pathway to elite performance Part 2: Examining environmental and stage-related differences in skills and behaviours. *The Sport Psychologist*, 24, 74-96. doi:10.1123/tsp.24.1.74
- Mills, A., Butt, J., Maynard, I., & Harwood, C. (2012). Identifying factors perceived to influence the development of elite youth football players. *Journal of Sport Sciences*, 30, 1593-1604. doi:10.1080/02640414.2012.710753
- Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS medicine*, 151, 264-269. doi:10.1371/journal.pmed.1000097
- Orlick, T., & Partington, J. (1988). Mental links to excellence. *The Sport Psychologist*, 2, 105-130. doi:10.1123/tsp.2.2.105
- Pierce, S., Kendellen, K., Camiré, M., & Gould, D. (2018). Strategies for coaching for life skills transfer. *Journal of Sport Psychology in Action*, 9, 11-20. doi:10.1080/21520704.2016.1263982
- Pope, C., Mays, N., & Popay, J. (2007). *Synthesizing qualitative and quantitative health research: A guide to methods*. Maidenhead, UK: Open University Press.
- Pluye, P., Robert, E., Cargo, M., Bartlett, G., O'Cathain, A., Griffiths, F., Boardman, F., Gagnon, M.P., & Rousseau, M.C. (2011). Proposal: A mixed methods appraisal tool for systematic mixed studies reviews. Retrieved on [08/02/2019] from

<http://mixedmethodsappraisaltoolpublic.pbworks.com>. Archived by WebCite® at
<http://www.webcitation.org/5tTRTc9yJ>.

Reber, A. S. (1995). *Penguin dictionary of psychology (2nd ed.)*. Penguin Books, UK: Harmondsworth.

Smith, M. F. (2010). *Research methods in sport*. Exeter, UK: Learning Matters.

Thomas, P. R., Murphy, S. M., & Hardy, L. (1999). Test of performance strategies: Development and preliminary validation of a comprehensive measure of athletes' psychological skills. *Journal of Sport Science, 17*, 697-711.
doi:10.1080/026404199365560

Toering, T. T., Elferink-Gemser, M. T., Jordet, G., & Visscher, C. (2009). Self-regulation and performance level of elite and non-elite youth soccer players. *Journal of Sport Science, 27*, 1509-1517. doi:10.1080/02640410903369919

Van Yperen, N. W. (2009). Why some make it and others do not: Identifying psychological factors that predict career success in professional adult soccer. *The Sport Psychologist, 23*, 317-329. doi:10.1123/tsp.23.3.317

Weed, M., Coren, E., & Fiore, J. (2009). *A systematic review of the evidence base for developing a physical activity and health legacy from the London 2012 Olympic and Paralympics Games*. London, UK: Department of Health.

Weinberg, R., Butt, J., & Culp, B. (2011). Coaches' views of mental toughness and how it is built. *International Journal of Sport and Exercise Psychology, 9*, 156-172.
doi:10.1080/1612197X.2011.567106

Williams, J. M., & Krane, V. (2001). Psychological characteristics of peak performance. In J. M. Williams (Ed.), *Applied sport psychology: Personal growth to peak performance* (4th ed., pp. 137-147). Mountain View, CA: Mayfield.

Woodcock, C., Holland, M. J. G., Duda, J. L., & Cumming, J. (2011). Psychological qualities of elite adolescent rugby players: Parents, coaches, and sport administration staff perception and supporting roles. *The Sport Psychologist*, 25, 411-443.
doi:10.1123/tsp.25.4.411

Table 1

Identification, Grouping, Labelling, Categorisation, and Definition of Psychological Skills that Increase Athletes' Likelihood to Achieve Athletic Excellence

Psychological Skills (Learned skills that regulate and facilitate the development of psychological characteristics)			
Umbrella Term	Encompassed Terms: Antecedents, Synonyms, & Associated Behaviours/Outcomes	Authors	Definition Summarised based on information from included studies.
Goal - Setting	Antecedents: • N/A	Butt et al., (2010); Connaughton et al., (2008; 2010); Cook et al., (2014); Durand-Bush and Salmela, (2002); Gould et al., (2002); Harwood (2008); Hill et al., (2015); Holt and Dunn (2004); Howells (2017); Jones and Lavallee (2009); Jonker et al., (2010); Kruger et al., (2012); Larsen et al., (2012); MacNamara et al., (2010b); Mills et al., (2012); Toering et al., (2009); Van Yperen, (2009); Weinberg et al., (2011); Woodcock et al., (2011) n = 20 out of 25	<p>The term “goal-setting” describes “a motivational technique widely used in sport which involves the assigning and choosing of specific goals which an athlete strives to achieve” (Kent, 1996, p. 190). Goal-setting can help athletes to stay focused, motivated, determined, confident, and evaluate themselves. Commonly athletes use three types of goals to guide and enhance their performance, including outcome, performance, and process goals.</p> <p>Outcome goals focus on the outcome of events or competitive results, such as winning a match or beating an opponent (e.g., “I want to win the Olympics in 2020”). Despite motivating, a sole focus on outcome goals can have its pitfalls, as these goals are not only dependent on athletes’ personal performance, but also factors that lie outside athletes’ control (e.g., the opponent’s performance, or financial, academic and physical constraints).</p> <p>Performance goals focus on achieving performance objectives that are independent of other competitors. Therefore, performance goals focus on personal accomplishments, such as beating one’s personal best or learning a new skill (e.g., “I aim to increase my basketball field goal shooting percentage from 45 to 50 percent”). As a result,</p>
	Synonyms: • Mental planning		
	Associated behaviours/outcomes: • N/A		

			<p>performance goals tend to be more flexible and under athletes' control than outcome goals.</p> <p>Process goals focus on the actions athletes' need to take to achieve their performance goals. Consequently, they are focused on the behaviours an athlete needs to engage in to achieve a specific performance target. For example, if an athlete aims to improve his/her basketball field goal shooting percentage by 5%, it could be an athlete's performance goal to practice goal shooting in their own time for at least one hour, three times a week, over the next month.</p> <p>It is recommended to set and frequently reflect upon a combination of the three goal types, as they all play a fundamental role in motivating athletes and directing their behaviours.</p>
Social Support Seeking	Antecedents: <ul style="list-style-type: none"> • N/A 	Butt et al., (2010); Connaughton et al., (2008; 2010); Cook et al., (2014); Durand-Bush and Salmela (2002); Gould et al., (2002); Holland et al., (2010); Holt and Dunn (2004); Jones and Lavallee, (2009); Larsen et al., (2012); MacNamara et al., (2010b); Mills et al., (2012); Van Yperen, (2009); Woodcock et al., (2011) n = 14 out of 25	The term "social support seeking" describes athletes' ability and willingness to ask for and receive help and advice from others such as coaches, parents, teammates, or teachers. Holt and Dunn (2004) identified three different types of support namely emotional support (i.e., the ability to turn to others for comfort and security during times of stress), informational support (i.e., advice and guidance about possible issues), and tangible support (i.e., concrete assistance). Seeking social support is perceived to facilitate athletes' resilience, ability to overcome obstacles and help them to balance sport and other life responsibilities.
	Synonyms: <ul style="list-style-type: none"> • N/A 		
	Associated behaviours/outcomes: <ul style="list-style-type: none"> • Taking advantage of a supportive climate 		
Realistic Self-Evaluation	Antecedents: <ul style="list-style-type: none"> • Self-awareness 	Connaughton et al., (2008; 2010); Cook et al., (2014); Durand-Bush and Salmela (2002); Hill et al., (2015); Jonker et al., (2010); Larsen et al., (2012); MacNamara et al., (2010b); Mills et al., (2012); Toering et al., (2009) n = 10 out of 25	The term "realistic self-evaluation" describes a key process of expert learning that athletes use to recapture experiences and assess performance outcomes after training and competition. It enables athletes to assess their progress and identify strengths and areas of improvement to generate new goals for personal development. It facilitates learning and helps athletes to refocus on their development and cope with various events such as losses or de-selection. This process can be conducted in an informal (e.g., talking a game through with a parent or coach) or structured manner (e.g., reflective diaries).
	Synonyms: <ul style="list-style-type: none"> • N/A 		
	Associated behaviours/outcomes: <ul style="list-style-type: none"> • Managing performance and 		

	process outcomes effectively <ul style="list-style-type: none"> • Realistic performance evaluations • Self-reflection • Reflection on action • Self-monitoring • Being able to keep things in perspective • Awareness of weaknesses 		
Imagery	Antecedents: <ul style="list-style-type: none"> • N/A 	Connaughton et al., (2008; 2010); Durand-Bush and Salmela (2002); Howells, (2017); Jooste et al., (2013); MacNamara et al., (2010a; 2010b) n = 7 out of 25	<p>The term “imagery” describes a technique athletes can use to acquire new skills and maintain, review, and rehearse already existing skills, techniques, or routines. It can help athletes to familiarize themselves with important parts of their performance, even when physical execution is not possible, and fosters their confidence, motivation, and ability to focus.</p> <p>Imagery involves the production of vivid images of situations or skills in athletes’ minds using all senses including sounds, smells, visuals, and feelings. The key is to create an image that is as close to reality as possible. Imagery can be used prior to matches/training (e.g., to reduce nervousness), during matches/training (e.g., to refocus or boost motivation), or after matches/training (e.g., to review a match). In order for imagery to enhance performance, athletes have to envisage themselves performing effectively (i.e., using a good technique and feeling confident in their performance), producing clear, vivid, and controllable images.</p>
	Synonyms: <ul style="list-style-type: none"> • Visualization • Mental planning 		
	Associated behaviours/outcomes: <ul style="list-style-type: none"> • Positive images • Mental imagery 		
Relaxation	Antecedents: <ul style="list-style-type: none"> • N/A 	Connaughton et al., (2008; 2010); Durand-Bush and Salmela (2002); Holland et al., (2010); Howells (2017); Larsen et al., (2012) n = 6 out of 25	<p>“Relaxation” frees athletes from tension, worry, stress, and anxiety. It can be used in a structured manner through progressive muscle relaxation or meditation, or informal manner to unwind from the stresses of being an athlete (e.g., spending time with family and friends), or to get into an appropriate mindset before a competition (e.g., keeping to oneself, or listening to music). It can prevent athletes from burning out and getting bored.</p>
	Synonyms: <ul style="list-style-type: none"> • N/A 		
	Associated behaviours/outcomes: <ul style="list-style-type: none"> • N/A 		

Maintaining a Sense of Balance	Antecedents: <ul style="list-style-type: none">• N/A	Connaughton et al., (2008; 2010); Durand-Bush and Salmela (2002); Holland et al., (2010); Larsen et al., (2012) n = 5 out of 25	The term “maintaining a sense of balance” describes athletes’ ability to have other interests in their lives, such as school, friends, family, and other hobbies. It has been found to help athletes to stay motivated, not get bored of their sport, and develop an identity away from the sport context, which facilitates their ability to work through challenging phases such as injury, de-selection, or early retirement more effectively.
	Synonyms: <ul style="list-style-type: none">• N/A		
	Associated behaviours/outcomes: <ul style="list-style-type: none">• N/A		
(Pre-) Performance Routines	Antecedents: <ul style="list-style-type: none">• N/A	Durand-Bush and Salmela (2002); Connaughton et al., (2008; 2010) Gould et al., (2002); Holt and Dunn (2004) n = 5 out of 25	The term “(pre-) performance routine” describes a set sequence of behaviours and thoughts that athletes engage in prior or during a performance of a specific skill or competition. In order for performance routines to be effective in competitions, they must be carefully planned and practiced in training. In addition, performance routines cannot be mistaken with superstitions, instead they must lie within athletes’ control. Commonly, routines are implemented consistently over a prolonged period of time. For example, a golfer might always approach his/her shots in the same manner. Nevertheless, they should also be flexible and adaptable in case the current routine is not helping the athlete to achieve the necessary state of readiness. (Pre-) performance routines are effective as they help athletes to focus on task-relevant information and block out distractions, thus increasing athletes’ concentration and confidence.
	Synonyms: <ul style="list-style-type: none">• N/A		
	Associated behaviours/outcomes: <ul style="list-style-type: none">• N/A		
Self-Talk	Antecedents: <ul style="list-style-type: none">• N/A	Connaughton et al., (2008); Durand-Bush and Salmela (2002); Gould et al., (2002); Holland et al., (2010); Howells (2017) n = 5 out of 25	The term “self-talk” describes all spoken words and internal thoughts that are directed at the self. It is a continuous stream of random, conscious, or purposeful thoughts. Self-talk affects athletes’ emotional states, attitudes, confidence, concentration, and consequently performances. Self-talk can be positive and productive and help athletes to focus on appropriate cues (e.g., “Great effort”, “Move your feet”, or “Good job”) or negative and unproductive and ruin performance (e.g., “Why did you do that?” or “You are playing
	Synonyms: <ul style="list-style-type: none">• N/A		

	Associated behaviours/outcomes: <ul style="list-style-type: none"> • Positive affirmation statements 		rubbish today”). Negative self-talk often occurs when athletes dwell on the past or think about the future. It is thus important to (a) become aware of one’s self-talk, (b) “be in the here and now”, (c) learn how to control one’s thoughts, and (d) replace negative self-talk with positive or instructional self-talk.
--	--	--	--

Table 2

Identification, Grouping, Labelling, Categorisation, and Definition of Psychological Characteristics that Increase Athletes' Likelihood to Achieve Athletic Excellence

Psychological Characteristics (Predisposed, fairly stable characteristics that can be regulated and facilitated through the use of psychological skills)			
Umbrella Term	Encompassed Terms: Antecedents, Synonyms, & Associated Behaviours/Outcomes	Authors	Definition Summarised based on information from included studies.
Hard-Work Ethic	Antecedents: <ul style="list-style-type: none"> • A vision of what it takes to succeed • Willingness to sacrifice 	Butt et al., (2010); Connaughton et al., (2008; 2010); Cook et al., (2014); Durand-Bush and Salmela (2002); Gould et al., (2002); Harwood (2008); Hill et al. (2015); Holland et al., (2010); Holt and Dunn (2004); Howells, (2017); Jones and Lavalley, (2009); Jonker et al., (2010); Larsen et al., (2012); MacNamara et al., (2010a; 2010b); Mills et al., (2012); Toering et al., (2009); Van Yperen (2009); Weinberg et al., (2011); Woodcock et al., (2011) n = 21 out of 25	Athletes with a “hard work ethic” commonly possess a vision of what it takes to succeed. Consequently, they: (a) consistently invest high levels of effort into training and competition over a prolonged time even if success is not immediately visible; (b) sacrifice their social lives due to their dedication towards their sport; (c) stay committed even if tasks are difficult or not inherently motivating; (d) cope well with large amounts of practice; (e) set high demands for themselves; (f) accept challenges and sometimes even suffer without giving up or dropping out of the sport they want to excel in, and (g) balance their sport and other life responsibilities effectively.
	Synonyms: <ul style="list-style-type: none"> • Commitment • Determination • Discipline • Dedication 		
	Associated behaviours/outcomes: <ul style="list-style-type: none"> • Investment of high levels of effort • Pushing oneself to the limit • Striving to learn and improve • Willingness to sacrifice • Consistency • Quality practice 		

	<ul style="list-style-type: none"> • Attention to detail • Persistence • Perseverance • Adaptive perfectionism 		
Emotional Control	Antecedents: <ul style="list-style-type: none"> • N/A 	Butt et al., (2010); Connaughton et al., (2008; 2010); Cook et al., (2014); Durand-Bush and Salmela (2002); Gould et al., (2002); Harwood (2008); Hill et al., (2015); Holland et al., (2010); Holt and Dunn (2004); Höner & Feichtinger, (2016); Jooste et al., (2013); Kruger et al., (2012); Larsen et al., (2012); MacNamara et al., (2010a; 2010b); Mills et al., (2012); Van Yperen (2009), Weinberg et al., (2011); Woodcock et al., (2011) n = 20 out of 25	“Emotional control” facilitates the regulation of arousal (e.g. before and during a competition). It describes athletes’ ability to cope effectively with stressors of development (e.g., transitions), adversity (e.g., low self-esteem), and feelings such as anxiety or pressure, which can negatively affect athletes’ performance. In addition, it is athletes’ ability to cope with various expectations and unforeseen circumstances (e.g., injury or de-selection).
	Synonyms: <ul style="list-style-type: none"> • Emotional awareness • Thought awareness and control 		
	Associate behaviours/outcomes: <ul style="list-style-type: none"> • Problem-focused coping behaviours • Coping with stress, pressure and anxiety effectively 		
(Self-) Confidence	Antecedents: <ul style="list-style-type: none"> • N/A 	Butt et al., (2010); Durand-Bush and Salmela, (2002); Connaughton et al., (2008; 2010); Cook et al. (2014); Gould et al. (2002); Harwood (2008); Hill et al. (2015); Holland et al., (2010); Holt and Dunn (2004); Howells, (2017); Hörner and Feichtinger, (2016); Jooste et al., (2013); Kruger et al., (2012); Larsen et al., (2012); MacNamara et al., (2010a; 2010b); Mills et al., (2012); Weinberg et al., (2011); Woodcock et al., (2011) n = 20 out of 25	The term “self-confidence” describes an inner conviction of personal competency and an ability to succeed. This conviction can be general or situation-specific. It refers to an athlete’s belief that he or she has the ability to successfully execute behaviours that are required to achieve certain outcomes.
	Synonyms: <ul style="list-style-type: none"> • (Self-) belief • Self-efficacy 		
	Associated behaviours/outcomes: <ul style="list-style-type: none"> • N/A 		
Interpersonal Competencies	Antecedents: <ul style="list-style-type: none"> • N/A 	Butt et al., (2010); Connaughton et al., (2010); Cook et al., (2014); Durand-Bush	The term “interpersonal competencies” describes athletes’ ability to interact effectively with others through the use of

	Synonyms: <ul style="list-style-type: none"> • The ability to utilize social skills 	and Salmela (2002); Gould et al., (2002); Harwood (2008); Hill et al., (2015); Holland et al., (2010); Holt and Dunn (2004); Howells (2017); Jones and Lavallee, (2009); Jooste et al., (2013); Kruger et al., (2012); Larsen et al., (2012); Mills et al., (2012); Weinberg et al., (2011); Woodcock et al., (2011)	social skills that allow them to get along with and function well in groups. This includes (a) respecting and expressing appreciation for others; (b) the ability to listen, give and receive feedback, and communicate effectively; (c) demonstrating context appropriate behaviours that are in line with social and cultural norms; and (d) using a range of methods to address and resolve conflicts.
	Associated behaviours/outcomes: <ul style="list-style-type: none"> • Positive social attributes such as squad spirit, leadership ability, good communication skills, being coachable, respect for others and the sport, and an ability to accept constructive criticism and advice 	n = 17 out of 25	
Motivation	Antecedents: <ul style="list-style-type: none"> • N/A 	Butt et al., (2010); Connaughton et al., (2008; 2010); Cook et al., (2014); Durand-Bush and Salmela (2002); Forsman, Blomqvist, Davids, Liukkonen, and Kontinen (2016); Hill et al., (2015); Holland et al., (2010); Holt and Dunn (2004); Hörner and Feichtinger (2016); Jones and Lavallee (2009); Jooste et al., (2013); Larsen et al., (2012); Mills et al., (2012); Weinberg et al., (2011); Woodcock et al., (2011)	The term “motivation” describes a feeling that drives and directs an individual’s behaviour towards a goal. It is defined by two dimensions; direction and intensity. Direction is concerned with movement towards a particular goal, whereas intensity is concerned with the amount of activation or arousal an individual invests. Intrinsic motivation was identified as crucial for athletes’ successful development as it helps athletes to stay on the pathway to excellence despite setbacks.
	Synonyms: <ul style="list-style-type: none"> • Drive • Desire 		
	Associated behaviours/outcomes: <ul style="list-style-type: none"> • Passion • Inspiration • Goal orientation • Enjoyment 	n = 16 out of 25	
Focus	Antecedents: <ul style="list-style-type: none"> • N/A 	Butt et al., (2010); Connaughton et al., (2008; 2010); Cook et al., (2014); Durand-Bush and Salmela (2002); Gould et al., (2002); Harwood (2008); Hill et al., (2015); Holland et al., (2010); Howells (2017);	The term “focus” describes athletes’ ability to concentrate attention on relevant cues in the environment even when distractions are present. This includes athletes’ ability to narrow, but also broaden attention if necessary and maintain concentration over the course of a whole game, event, and
	Synonyms: <ul style="list-style-type: none"> • Concentration 		

	Associated behaviours/outcomes: <ul style="list-style-type: none"> • Attentional focus • Task focus • Distraction control 	Jooste et al., (2013); Kruger et al., (2012); Larsen et al., (2012); MacNamara et al., (2010b); Mills et al., (2012); Weinberg et al., (2011) n = 16 out of 25	season. Further, it describes athletes' determination to engage in activities that are either beneficial or at least not interfering with their responsibilities of being an athlete (e.g., sacrificing social life).
Competitiveness	Antecedents: <ul style="list-style-type: none"> • N/A 	Connaughton et al., (2008; 2010); Cook et al., (2014); Durand-Bush and Salmela, (2002); Gould et al., (2002); Hill et al., (2015); Holt and Dunn (2004); Hörner and Feichtinger (2016); Jones and Lavalley (2009); Larsen et al., (2012); MacNamara et al., (2010a); Mills et al., (2012); Weinberg et al., (2011); Woodcock et al., (2011) n = 14 out of 25	The term “competitiveness” describes athletes' strong motivational desire to outperform or beat others during training and competitions. In addition, it describes an inherent urge that motivates people to compete against and compare themselves with others. Having a competitive nature drives individuals to get immersed in challenges and invest maximum levels of effort.
	Synonyms: <ul style="list-style-type: none"> • Competitive orientation 		
	Associated behaviours/outcomes: <ul style="list-style-type: none"> • N/A 		
Positivity	Antecedents: <ul style="list-style-type: none"> • N/A 	Butt et al., (2010); Connaughton et al., (2008; 2010); Durand-Bush and Salmela (2002); Gould et al., (2002); Harwood (2008); Holland et al., (2010); Holt and Dunn (2004); Howells (2017); Hörner and Feichtinger (2016); Mills et al., (2012); Weinberg et al., (2011); Woodcock et al., (2011) n = 13 out of 25	The term “positivity” describes the frequent experience of pleasant emotions that enables athletes to overcome obstacles or negative events (e.g., losses, injury or hardship). A high degree of positivity enables individuals to interpret negative events in an optimistic manner and view these as opportunities for personal growth.
	Synonyms: <ul style="list-style-type: none"> • Positive mindset • Optimism 		
	Associated behaviours/outcomes: <ul style="list-style-type: none"> • Hope (for success) • Open-mindedness • Gratitude 		
Resilience	Antecedents: <ul style="list-style-type: none"> • N/A 	Butt et al., (2010); Connaughton et al., (2008); Cook et al. (2014); Gould et al. (2002); Harwood (2008); Hill et al. (2015); Holland et al., (2010); Holt and Dunn (2004); Jones and Lavalley, (2009); Mills et al., (2012); Weinberg et al., (2011); Woodcock et al., (2011) n = 12 out of 25	The term “resilience” describes athletes' ability to overcome and recover quickly (“bounce back”) from setbacks and adversity without suffering from any negative impact of the particular experience. It allows athletes to overcome personal and contextual obstacles and stay on the pathway to excellence without major setbacks (i.e., burning out).
	Synonyms: <ul style="list-style-type: none"> • The ability to bounce back after setbacks • The ability to overcome obstacles 		
	Associated behaviours/outcomes: <ul style="list-style-type: none"> • Overcoming obstacles more readily 		

	<ul style="list-style-type: none"> • Adaptability • Flexibility • Bouncing back after setbacks • Reacting positively to setbacks • Accepting mistakes and moving on 		
Independence	Antecedents: <ul style="list-style-type: none"> • N/A 	Connaughton et al. (2010); Cook et al., (2014); Durand-Bush and Salmela (2002); Hill et al., (2015); Holland et al., (2010); Holt and Dunn (2004); Howells (2017); Jones and Lavalley, (2009); Larsen et al., (2012); Mills et al., (2012); Woodcock et al., (2011) n = 11 out of 25	The term “independence” describes athletes’ ability to take personal responsibility for their development and learning. Independent athletes conduct themselves in a manner that is supportive of their development (e.g., getting enough sleep, eating well, and not drinking alcohol) and thrive to realise every developmental opportunity they are afforded. It is athletes’ ability to make decisions and act free from outside control (e.g., engaging in additional individual training without being told to do so).
	Synonyms: <ul style="list-style-type: none"> • N/A 		
	Associated behaviours/outcomes: <ul style="list-style-type: none"> • Taking responsibility • Self-organisation • Self-reliance 		
Sport Intelligence	Antecedents: <ul style="list-style-type: none"> • N/A 	Connaughton et al., (2008; 2010); Durand-Bush and Salmela (2002); Gould et al. (2002); Hill et al., (2015); Holland et al., (2010); MacNamara et al., (2010a); Mills et al., (2012); Weinberg et al., (2011) n = 9 out of 25	The term “sport intelligence” describes athletes’ mental ability to (a) fully understand the nature of their sport; (b) make the right decision in the right moments; (c) anticipate opponents moves; (d) have great awareness of the environmental space they are engaging in; (e) learn quickly; (f) implement new information into practice; (g) analyse game situations quickly; and (h) be innovative.
	Synonyms: <ul style="list-style-type: none"> • Game sense • Game knowledge • Game understanding 		
	Associated behaviours/outcomes: <ul style="list-style-type: none"> • Anticipation • Creativity • Innovation 		

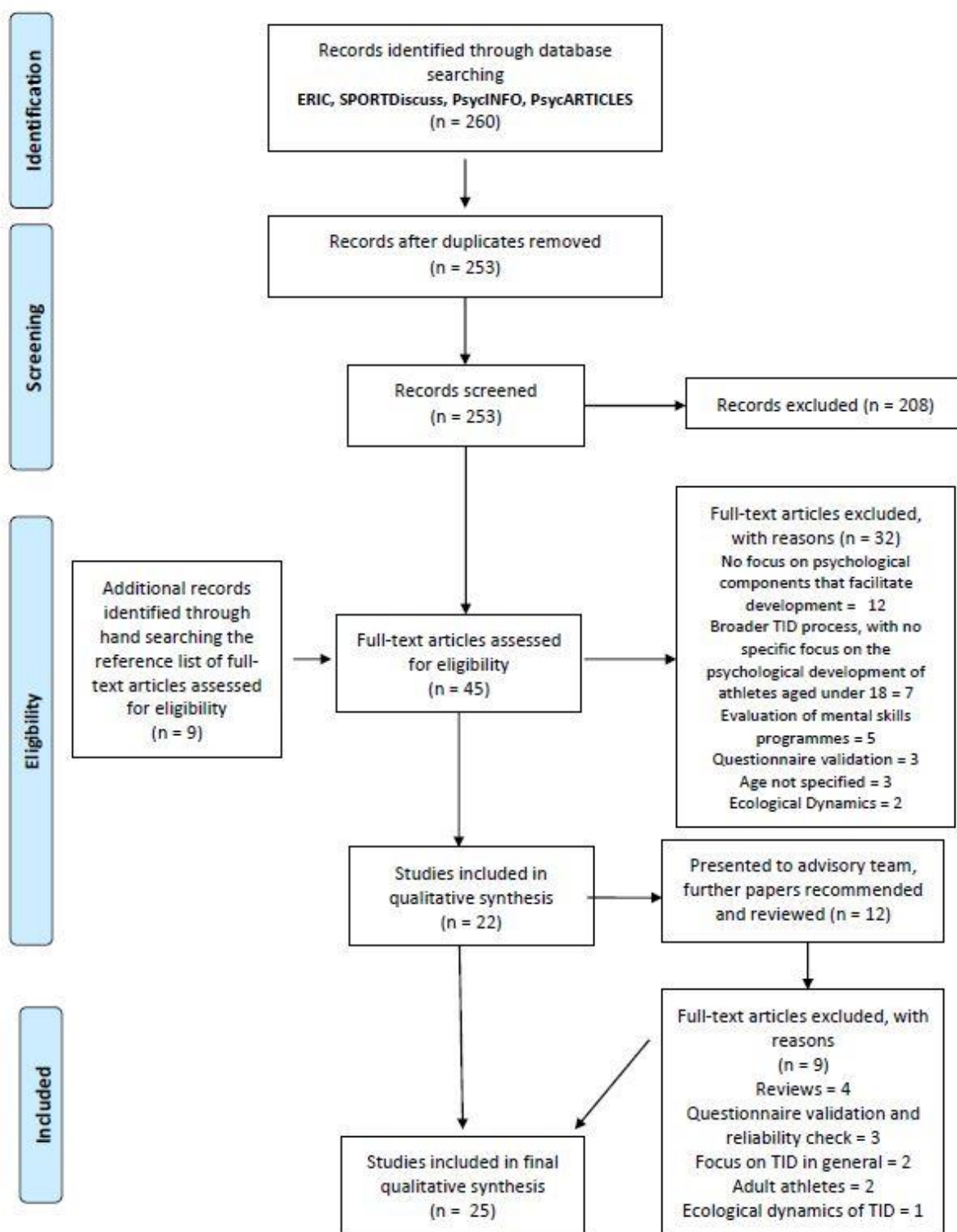


Figure 1. PRISMA flow diagram.

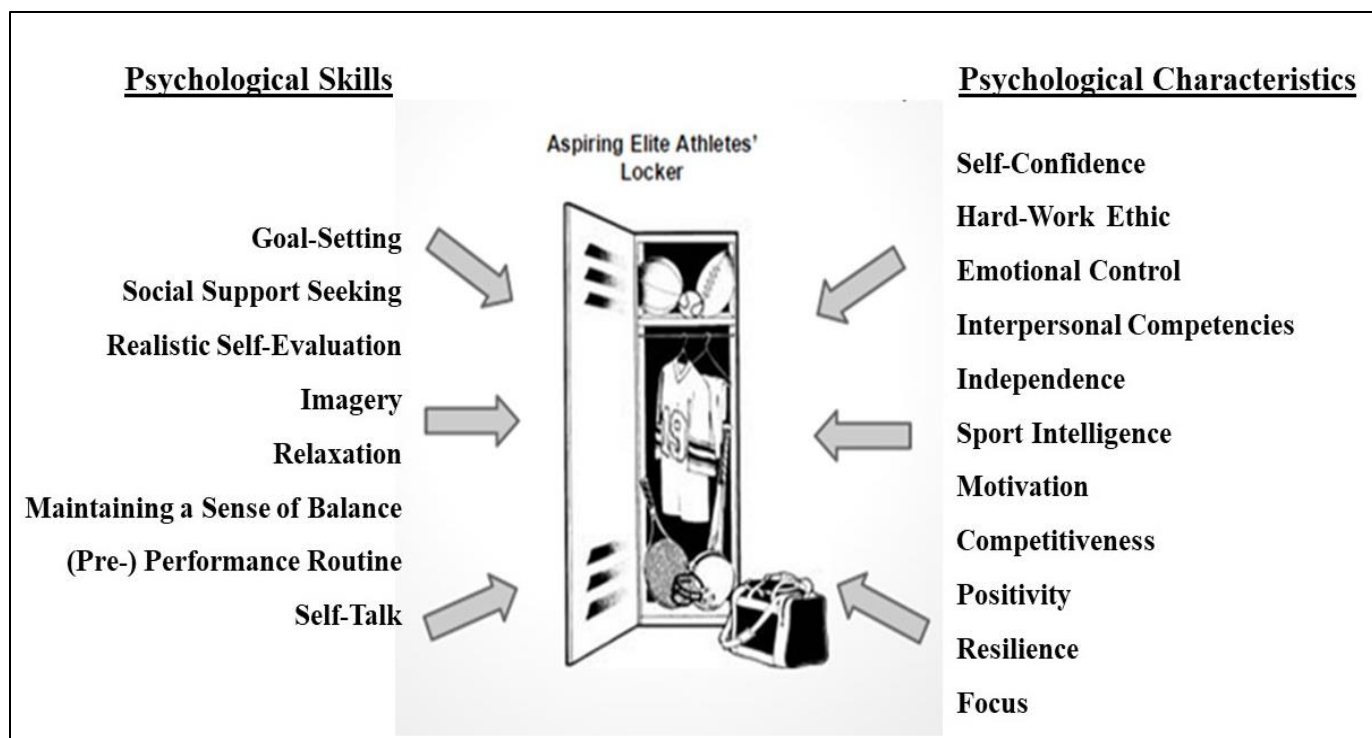


Figure 2. Aspiring Elite Athletes' Locker.